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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/269,485 | 03/29/1999 | EVA KUHN | CU-1867RJS | 1080 |

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| ART UNIT | PAPER NUMBER |
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| 2126 | 9 |

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Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|------------------------|------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 09/269,485 | KUHN, EVA | |
| | Examiner Li B. Zhen | Art Unit 2126 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on 10 February 2003.

2a) This action is FINAL. 2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

4) Claim(s) 10-18 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) Claim(s) _____ is/are allowed.

6) Claim(s) 10-18 is/are rejected.

7) Claim(s) _____ is/are objected to.

8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) The proposed drawing correction filed on _____ is: a) approved b) disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.

12) The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) The translation of the foreign language provisional application has been received.

15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

| | |
|--|--|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ . |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____. . | 6) <input type="checkbox"/> Other: |

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities: “shareing” on p. 21, line 26. Appropriate correction is required.

Note: This is the second time the specification is objected to. The applicant has addressed most of objections in the response filed on February 10, 2003, but the response did not address the objection listed above; therefore, the specification remains objected to.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over “Fault-Tolerance for Communicating Multidatabase Transactions” (herein referred to as Kuhn94) in view of U.S. Patent No. 5,734,898 to He.

As to claim 10, Kuhn94 teaches coordination servers (CoK, Section 3, Fig. 3), local software systems are extended by functions for managing transactions, communication objects, and processes (Section 3, CoK primitives “language&CO”), communication objects identified by object identification numbers to exchange messages (Section 3.3), transactions are used to realize communication (Section 3, an advanced communication mechanism based on shared data that can be written in

transactions), only processes possessing a reference to a communication object are granted access (Section 3, each process may only see those communication objects to which it possesses a reference that is passed to the process via its parameter list), processes (Section 3.1, 3rd and 4th paragraph) are granted access to passed communication objects (communication objects may be passed in "args"...so that they become shared between the site calling PROCESS and the site where the PROCESS is executed), communication objects are administered by replication strategies that are selectable (Section 4.2, ...for each communication object a different strategy may be used), application programs do not depend on distribution strategies (Section 4.1, 11th paragraph,...maintenance of communication object is separated from the processes executing the programs that access communication objects; Conclusion, ...depending on the application requirements, different strategies can be employed that are realized by different replication techniques), coordination servers have the same basic functionality and together form a global operating system (Section 3 A Distributed Coordination Kernel), and the distributed coordination kernels would make up a distributed space and form a global operating system. Kuhn94 does not teach updateable objects and transactional blocking read of updateable objects.

However, He teaches (column 7, lines 9 – 37) updateable objects (object being updated) and transactional blocking read (read lock) of updateable objects.

It would have been obvious to apply updateable objects as taught by He to the invention of Kuhn94 because updateable objects would reduce memory space requirements by reusing existing objects to store dynamic data instead of creating a

new object. In addition, it would have been obvious to apply transactional blocking read as taught by He to the invention of Kuhn94 because transactional blocking read would preserve data integrity by blocking transactions that change the content of the object while another process is reading data from the object.

As to claim 11, Kuhn94 teaches a basic strategy is selected in combination with strategy flags (Section 4.2, ...for each communication object, a different strategy may be used—defined as part of its type description). Obviously, that the part of the type description that defines the distribution strategy could be represented in various formats, such as variables, numbers, or flags.

As to claim 12, Kuhn94 teaches (Section 3.1) the local software systems can be started by the corresponding coordination server (PROCESS primitive...can start a process—if supported by the corresponding software system it starts a thread—at another site). Since a process is used to execute an application program, starting a process would start the software. In addition, Kuhn94 teaches (Section 3.2, Failure Behavior) the CoK recovers all communication objects, re-starts all PROCESS.

4. Claims 13 – 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuhn94, and He in view of “Logic Based and Imperative Coordination Languages” (herein referred to as Forst).

As to claim 13, Kuhn94 as modified does not teach clearing communication objects that are no longer referenced.

However, Forst teaches (Section 5, 2nd paragraph, 2nd bullet, Garbage collection) clearing communication objects that are no longer referenced.

It would have been obvious to apply clearing communication objects that are no longer referenced as taught by Forst to the invention of Kuhn94 as modified because it would decrease memory usage by clearing objects that are no longer used.

As to claim 14, Kuhn94 as modified does not teach distributing heterogeneous transactions to different sites.

However, Forst teaches (Section 2.1.2; Section 2.1.3, 3. compensate actions) distributing heterogeneous transactions to different sites (spawn and control a process on another site), global transaction and subtransactions.

It would have been obvious to apply distributing heterogeneous transactions to different sites as taught by Forst to the invention of Kuhn94 as modified because distributing heterogeneous transactions to different sites would decrease processing time by allowing multiple sites to perform parts of the transaction. In addition, Kuhn94 teaches (Section 3.1 Primitives for Coordination) a TRANS_ENTRY type process that starts a new autonomous TRANS (transaction) that runs decoupled from the call TRANS.

As to claim 15, see claim 1 above.

As to claim 16, Kuhn94 as modified teaches transaction processing (Section 3.1 of Kuhn94) but does not specify the limitations as brought out by this claim.

However, Forst teaches (Section 2.1.3) writing into an object (write/test/read of communication objects), compensation action (compensation actions), (3.3, 1st paragraph, transactions used in other transactions are name subtransaction), and

starting of a subtransaction are provided as transactional predicates. As to distribution of part of a transaction to another site, see claim 14 above.

Forst teaches transaction processing in a coordination system; therefore, it would have been obvious to apply the transaction predicates as taught by Forst to the invention of Kuhn94 as modified.

As to claim 17, Kuhn94 as modified does not teach starting an on-commitment action if it is sure that a transaction will commit.

However, Forst teaches (Section 3.3, 1st paragraph...several prepare/1 predicates may occur within a transaction...are called on commitment) starting an on-commitment action if it is sure that a transaction will commit (the argument of the predicate prepare/1 defines a predicate which is activated on commitment, if it is sure that all cvar/1 tests...can be performed). In addition, Forst teaches (Section 2.1.3, 4. prepared phase) prepared phases are executed by the commit procedure of a transaction when it is sure that the assignment of communication object values will be possible, i.e., the transaction will succeed (transaction commits).

It would have been obvious to apply starting an on-commitment action if it is sure that a transaction will commit as taught by Forst to the invention of Kuhn94 as modified because it would allow subtransactions to commit when the global transaction is not done processing.

As to claim 18, Kuhn94 as modified does not teach a programmable backtracking of transactional operations that dynamically repair faults or failures in the transactions.

However, Forst teaches (Section 2.1.3, 5th paragraph) a programmable backtracking of transactional operations (user-defined compensate actions) that dynamically (automatically activated) repair faults (a communicated value is no longer valid) or failures in the transactions (a user-defined compensate action may be specified, which is automatically activated).

It would have been obvious to apply a programmable backtracking of transactional operations that dynamically repair faults or failures in the transactions as taught by Forst to the invention of Kuhn94 as modified because it would allow a user to define actions to respond to faults or failures.

Response to Arguments

5. Applicant's arguments filed February 10, 2003 have been fully considered but they are not persuasive.

The applicant's argues, "...the prior art reference Kuhn94 only refers to a 'globally shared space' and does not teach or suggest the distributed space... 'globally shared space' of Kuhn94 is not at all the claimed 'global operating system'" (p. 3, lines 15 – 21). The examiner agrees that the 'globally shared space' of Kuhn94 does not suggest a global operating system; however, Kuhn94 teaches (Section 3) a distributed coordination kernel framework that allows languages at different cites to communicate in a reliable way. Therefore, the distributed coordination kernels would make up a distributed space and form a global operating system.

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies

(i.e., “coordination system is a peer-to-peer system,” p. 4, lines 1 – 2; “updateable objects of the presently claimed system are coordinated by means of an optimistic concurrency control,” p. 4, lines 4 – 5; “presently claimed system does not use explicit locks on objects,” p. 4, lines 6 – 7; “a logical time stamp is introduced for updateable objects,” p. 4, lines 19 – 20) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. Therefore, the claims as recited do not preclude the use of the reference to He.

Applicant appears to argue that Kuhn94 does not teach application programs that are independent of the distribution strategy that is selected. The examiner respectfully disagrees because Kuhn94 teaches (Section 4.1, 11th paragraph) the maintenance of communication object is separated from the processes executing the programs. The maintenance process would implement distribution strategies of the communication objects and since the maintenance process is separated from the executing programs (application programs), the executing programs would not depend on the distribution strategies. In addition, Kuhn94 teaches (Conclusion) the reliability of communicated objects can be fine-tuned, and different strategies can be employed that are realized by different replication techniques depending on the application requirements. Therefore, the application program is independent of the distribution strategy because the distribution strategy of the communication object depends on the application program.

The applicant notes, “to define these common semantics, the logical time stamp of updateable objects plays an important role” (p. 6, lines 12 – 17). The examiner

respectfully submits that the features cited above are not brought out in the rejected claims.

Applicant argues, "...Claim 11 is substantially different from Kuhn94 in that Claim 11 allows the selection of a basic protocol type...and that this basic communication protocol can be parameterized" (p. 7, lines 7 – 9). The examiner respectfully disagrees because Kuhn94 teaches (Section 4.2) that for each communication object, a different strategy may be used—defined as part of its type description. It is obvious that the part of the type description that defines the distribution strategy could be represented in various formats, such as variables, numbers, or flags. In addition, the applicant submits, "...there exist analogous flags for each distribution protocol" (p. 7, lines 9 – 10). Claim 11 (lines 2 – 3) recites, "a basic strategy is selected in combination with additional, optional strategy flags," but does not limit the strategy flags to correspond to each distribution protocol.

In response to the applicant's statements on p. 7 lines 19 – 23, the reference to Kuhn2 was probably not necessary because Kuhn94 also teaches the limitations of claim 12 (see the rejection above).

The applicant argues, "Forst does not teach or suggest...both the automatic garbage collection and/or the manual...garbage collection" (p. 8, lines 4 – 6). The examiner respectfully disagrees because claim 13 does not recite automatic garbage collection and/or manual garbage collection. Instead, the rejected claim 13 recites "communication objects, to which no locally running process possesses a reference any more, are automatically cleared by the corresponding coordination server or can be

explicitly freed" (lines 1 – 4). Claim 13 does not require both automatically freeing and explicitly freeing unreferenced objects because the claim recites, "automatically cleared...or can be explicitly freed" (lines 3 – 4). Forst teaches (Section 5, 2nd paragraph, 2nd bullet) garbage collection, which is the automatic process of deallocated memory objects that are no longer in use.

Applicant appears to argue that Forst does not teach distributed transactions (p. 8, lines 7 – 17). The examiner respectfully disagrees because Forst teaches (Section 2.1.2) spawn and control a process on another site, and processes execute transactions; therefore the processes are transactional processes. Also, Forst teaches (Section 2.1.3, 3. compensate actions) a global transaction and subtransactions, which would suggest the distribution of subtransactions that form a global transaction. Additionally, Kuhn94 teaches (Section 3.1 Primitives for Coordination) a TRANS_ENTRY type process that starts a new autonomous TRANS (transaction) that runs decoupled from the call TRANS.

The applicant argues, "the 'on-commitment'...actions as recited in Claim 17 have a different meaning from Forst...the on-commit actions are started if the transaction is going to definitively perform its commit" (p. 8, line 22 – p. 9, line 1). The examiner respectfully disagrees because Forst teaches (Section 2.1.3, 4. prepared phase) prepared phases are executed by the commit procedure of a transaction when it is sure that the assignment of communication object values will be possible, i.e., the transaction will succeed (transaction commits).

Applicant appears to argue that Forst does not teach “the dynamic and programmer controlled repair of transactions...after a unsuccessful try to commit the transaction” (p. 9, lines 17 – 19). The examiner respectfully disagrees because Forst teaches (Section 2.1.3, 5th paragraph) a programmable backtracking of transactional operations (user-defined compensate actions) to dynamically (automatically activated) repair faults (a communicated value is no longer valid) or failures in the transactions (a user-defined compensate action may be specified, which is automatically activated).

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Li B. Zhen whose telephone number is (703) 305-3406. The examiner can normally be reached on Mon - Fri, 8am - 4:30pm.

The fax phone numbers for the organization where this application or proceeding is assigned are (703) 746-7239 for regular communications and (703) 746-7238 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

Li B. Zhen
Examiner
Art Unit 2126

Ibz
April 17, 2003

Sue Lao